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## THE JOURNAL OF PHILOSOPHY

### PSYCHOLOGY AND SCIENTIFIC METHODS

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#### DUALISM AND EARLY MODERN PHILOSOPHY. II

THIS lengthy excursus into Thomistic doctrine was for the purpose of giving full exemplification of the interweaving of the influences whose history is being sketched. For the remainder of the paper there remains only the description of certain larger transformations. First of all it is necessary to consider a new set of ideas that begin to work in the scholastic scheme and force the precipitation therefrom of an unambiguous dualism. This set of ideas is that which defines and inspires the new sciences of nature.

The scientific movement removed forms and species from nature—this was its first step, for the exclusion of qualitative determinations from nature was the necessary preliminary to the revelation of nature as a mechanical material system. The term matter, which for centuries had possessed in the main its Aristotelian meanings, receives now a new set of implications. The positive side of the process has many aspects: The revival of atomism, and the development of the corpuscular theory; the revival of ancient skepticism, which prejudices the magisterial rights of metaphysics and theology over nature, and, assisted by nominalism, encourages the empirical tendency and heartens experimental inquiry; and in general the individualistic spirit gave spontaneity and independence to thought. The influence of mathematics was enormous. Quantity had been only an accident of things, since it was variable with respect to the individualized forms; it now became the chief feature of matter, its very essence. As soon as matter is stripped of forms, it appears as a realm free for mathematical exploitation. The more successful the application of mathematics to matter, the more definite became the new meanings and implications of the term matter, the more completely was it released from its Aristotelian connotations, and the more objectionable became the older notions concerning inner forms and occult qualities. Nature is revealed as a mechanical system, and mechanics becomes the mathematical theory of nature.

What effect did these changes have upon the dualistic conceptions of tradition? Evidently a sharpening and accentuation of the dual-

istic ideas must occur, with profound effects upon psychological and epistemological theory.

Substances had been things, qualitatively distinct, hierarchically arranged, the series ranging from the actual things of the perceptual world, inanimate and animate things, through persons and angels to God. We have seen that conceptual instruments bequeathed by Aristotle had not sufficed to devise a psychology, or ontology, or theology without points of cleavage and instances of discontinuity. Ideas springing from the emotional attitudes that characterized the growing world-outlook of the period after Aristotle conflicted with the proper utilization of the peripatetic concepts, or suffused them with alien meanings. The serially ordered system of substances always tended to split in two, the point of weakness being the rational human soul. Now when nature comes to be conceived mechanically, and matter becomes quantitatively defined, forms are excluded from nature and matter. Nature thus became one substance, in place of being many. Form and matter are completely separated. But the concept of form had received more and more the quality of spirituality. The hierarchical order, already weakened, collapses under the impact of the new conception of nature. If nature becomes one substance, so the whole system of forms must come to form one substance. The distinction between spiritual and corporeal substances was already at hand. Corporeality now means materiality, with no reference to form whatever. There is but one refuge for forms, namely, as modes or aspects of spiritual substance. There had always existed a certain kinship, psychologically, ethically, and theologically, between the immortal rational principle in man and the nature of angels and God. It was easy to group these together as partaking of the same substantial nature; they were incorruptible, they were immaterial (form), they were spiritual, and thinking was their peculiar power and act. The way was plain; all were spiritual in substance. The ontological dualism must follow. The concepts of form, of the extra-corporeal status of reason, and of spiritual creature had become the vehicles for the establishment of religious values; the retirement upon the concept of spiritual substance, defined as the antithesis of matter, as the basis of these ideas, preserved these values from annihilation by assuring escape from mechanics and its category of quantity.

As the tendency to envisage the world of nature as a system resting upon mechanical principles grew stronger, accordingly, thinking things no longer form the apex of the qualitative ladder of actualities, energies, and realizations. They became substantially homogeneous. The concept of substance is retained, but its older common-sense context which gave it significance was removed. In place of the

former arrangement we have the extreme contrast of thought to things, with nature as the object of knowledge. Now with this concentration of a graded plurality of substances into the antithetical two there occurs a change in the leading categories. As nature, stripped bare of its masque of secondary and tertiary qualities, was progressively revealed as a machine, obeying inviolable laws capable of mathematical formulation, the irrelevance of formal and final causes is emphasized. This does not involve the complete disuse of formal and final causes, but only their inapplicability to nature. They are relegated to metaphysics. Mechanism and teleology are discerned as conflicting planes of interpretation and the conflict yields its full quota of problems.

The place of formal and final causes is taken by efficient causes, motion, impact, and the like. The older regulating conceptions, potentiality and actuality, were laid aside by the new science. Quantitative determinations become all-important. Furthermore, the interaction between substances, generally taken for granted whether explicable or not, persists in the new setting, and mind and matter are supposed to interact. Just how this took place was, perhaps, regarded as more or less of a mystery. Its mysteriousness did not constitute a problem until other issues connected with the dualism were made explicit.

This transformation inevitably wrought a change in epistemology and psychology, bringing forth new problems or momentous alterations in old ones. The matter can be given a general outline in the following way:

In terms of the orthodox scholastic conceptions, mind, and therefore knowing and knowledge, are the final realization of matter. Beneath the profusion of scholastic distinctions and verbiage this was the basic thought. Now with the surrender of the hierarchical ordering regulated by the concepts of potentiality and actuality, the sphere of existence is divided into two substances. The genuineness of knowledge of things had rested upon the correspondence of the species of thought to the generic forms of things. Perhaps a satisfactory explanation of this was not given; in one sense no explanation was needed just because knowing was the realization of the potentialities of matter. At any rate, with the telescoping of all substances into two, the correspondence or copy theory of knowledge persists. The knowing went on in an immaterial knower, intellect being pure form, and its means of knowing possessed the ideality of form. Now so long as the matter-form-potentiality-actuality scheme was maintained, the immateriality of knower and the knower's means of knowledge presented no obstacle. But when the knowing takes place in a spiritual substance unqualifiedly antithetical to the sub-

stance and nature of the things known, and the veracity of alleged knowledge is supposed to be tested by the correspondence of the mode of one substance to that of the other, the knowledge problem is set in dualistic terms; and the immateriality of the knower and correspondence as the test give birth to problems. Forms had been expelled from nature: the only "forms" remaining were geometrical, the configurations of bodies or extended substance. The *old* forms are all in the spiritual substance, and the term *idea*, hitherto mainly confined to denote that which the deity understands, comes to be applied to them. The possession of form by everything had hitherto provided a bond of kinship guaranteeing continuity between natural things and the knowing soul. But while formerly everything was both matter and form, now nothing is, or can be, both. The rupture is complete. If the old terms are to be used again, they must be provided with new meanings. In that case the ancient "matter" means *form as geometrical*, that is, configurations in extension, and these are the object of knowledge. Descartes's statement that "the infinitude of figures suffices to express all the differences in sensible things" expresses this.<sup>1</sup>

On this basis the question of the nature of the correspondence required for knowledge becomes acute. What sort of correspondence exists between a mode of spiritual substance, which is that which cognizes, and a mode of extended substance, which is that which is cognized? In its orthodox connection the correspondence was based on the maxim that like is known by like. But this maxim is gone beyond redemption when the knowledge problem is set in dualistic terms (however long it might take for this to be recognized), for by definition there is no resemblance whatever between the modes of the two substances. In time the correspondence is changed to a correlation, but the inherent difficulties remain.

Laying aside the epistemological aspect of the situation, let us consider the status of psychology. The orthodox scholastic psychology was hardly troubled by the differences between body and the rational soul. In one sense there had been no problem of the relation of body and soul, for everything necessarily possessed both matter and form. To inquire how a material thing could be animated by an immaterial form would have been a senseless question to the peripatetic scholastic—it was unthinkable that a living material body, or any body whatever, should be without form. That the soul, as a separate and separable form, should be united to a perishable body was just what was demanded by the teleological constitution of the world. But when the ontological dualism forces a mind-body dualism, the relation of body and soul was something of which psychology

<sup>1</sup> Rule 12 of the *Rules for the Direction of the Mind*.

must take account. And especially is this true when advance is made in physiological knowledge. The contrast between the rational soul and the other powers was never satisfactorily dealt with; the doctrine made the mind-body dualism all the more acceptable.

The intellectualistic psychology, such as that of St. Thomas, had become the orthodox doctrine. But before it attained this position, a psychology of a different type had been cultivated. The Thomistic type flowed from the use of Aristotelian writings. But before the days of Aristotle's ascendancy the regnant influence was that of St. Augustine. The dominant psychology was based on St. Augustine's thorough dualism of body and soul, and inner experience, the inner life of the self-conscious individual, was the leading principle.<sup>2</sup> This Augustinian movement united with the empirical tendency of nominalism, and a psychology of introspective analysis was developed. But with the ascendancy of Aristotle, the gap between body and soul was apparently closed or veiled, and psychology was based on the peripatetic metaphysics. Perhaps it is not too much to say that it required the impact of the new movements in the sciences to reopen the gap for the reinstatement of the Augustinian position. But after all, the speciousness of the psychology worked out in Aristotelian terms did not wholly obscure the opposition of soul and body and various attempts were made to lend greater continuity by the interpolation of a *forma corporeitatis* (*spiritus physicus*), as a mediator between the pure form of the soul and the body. This insertion, repudiated by Aquinas, is urged by Duns Scotus. William of Ockam follows Scotus in this.

As the two-substance theory became firmly intrenched, its effects were made manifest particularly in the theory of perception and imagination. The whole question of the nature and status of sense-qualities was forced to a revision.

This revision of the question is found even among the materialists. The materialistic conception of the soul, which Guizot somewhere asserts to have been the dominant idea in the first centuries of our era, was revised during Renaissance times along with the resurgence of the atomism of Democritus and Lucretius. The materialistic conception of the soul and the atomic theory had never wholly slipped from the attention of thinkers. The new interest in nature, however, caused these ideas to be congenial to some spirits. Thus to Telesius the soul was simply matter in its finest and most mobile state. The materialistic teaching was frequently disguised, for reasons prudential and sometimes perhaps sincerely religious, by the addition of an immortal and incorporeal soul. This *forma superaddita*, however, though advanced by such men as Telesius, Cardanus, and

<sup>2</sup> Cf. Windelband, *Geschichte der Philosophie*, par. 24.

Paracelsus, is not permitted to affect their psychology. It is in flagrant contradiction to the general tenor of their teaching, and in effect their psychology remains materialistic. The situation was glossed over by the conception of twofold truth. The materialists performed the service of renewing interest in physiological studies, and reviving the ancient notion of *pneuma*, made the theory of animal spirits the guide of physiology.<sup>3</sup> The materialistic—and physiological—explanation of sense and imagination was formulated in terms of this principle; and even among the dualists, as for example, Descartes, the notion is utilized.

But outside the circle of the materialists, a different situation arises. The pageantry of qualities that had covered nature was torn away and there remained only its bony quantitative framework. The problem is: what is to be done with secondary and tertiary sense-qualities? Since there are two worlds, and they are excluded from one of the two, the obvious answer is that they are in the other. Everything that mechanics and mathematics do not discover in nature must be in the human soul-substance. And much of philosophy since that time has consisted of a series of desperate assaults with the purpose of driving them out again.

William of Occam illustrates the movement. To him and his school qualities are merely signs of objective differences in things. His criticism of the *species intentionales* insists that "cognition is not the intussusception of an image (*species*) resembling the thing known, but an immanent act (*actus intelligendi*) which becomes the sign of the thing. Hence the *species intentionales* whether sensible or intellectual, is a useless fiction which should be banished."<sup>4</sup> Despite his addition of a *forma corporeitatis* and a sentient soul to the intellectual soul, the dualistic setting forces him to the subjectivity of qualities.

According to Windelband, the doctrine of the intellectuality of sense-qualities was a doctrine commanding many minds in Renaissance times. "Aus der skeptischen und der epikureischen Litteratur war die Lehre, dass Farben, Töne, Gerüche, Geschmäcke, Druck, Wärme, und Tastqualitäten nicht wirkliche Eigenschaften der Dinge, sondern nur Zeichen für solche im Geiste seien, unter Widerholung der antiken Beispiele in die meisten Lehren der neueren Philosophie übergegangen. Vives, Montaigne, Sanchez, Campanella, waren darin einig."<sup>5</sup> Further, "Galilei, Hobbes, Descartes erneuerten die demokritische Lehre, dass diesen qualitativen Differenzen der Wahrnehmung in natura rerum nur quantitativen Unter-

<sup>3</sup> Cf. De Wulf, *History of Medieval Philosophy*, pp. 474-475.

<sup>4</sup> De Wulf, *op. cit.*, p. 424.

<sup>5</sup> *Geschichte der Philosophie*, par. 31.

schiede so entsprächen, dass jene die innere Vorstellungsweise für diese seien.'"<sup>6</sup>

The status of sense and imagination forms the crucial problem. If we revert for a moment to the scholastic epistemology, we find one reason for this. With the reduction of the plurality of substances to a duality, many of the ideas concerning knowledge that were accompaniments of the older world-view persevere in the new setting. There had been two types of knowing: the first, direct apprehension of the essence, of the immaterial pure form, and this was perception of the highest kind, and an expression of the intellect's native energy: second, cognition dependent on the correspondence of the species in the mind to the form of the object, such knowledge of things being mediated by the *species intentionales*. In the dualistic world construction these modes of knowing are unequally affected. When the intellectual soul (pure form) became spiritual substance the notion of immaterial essences perdures, but receiving the connotations implied by the position of essences in the two-substance scheme. These essences, therefore, retained kinship with the spiritual thinking substance. In short, the power of directly apprehending and comprehending immaterial essences, or fundamental truths and axioms, such as mathematical and logical entities, continued to be the noblest function of the soul, the purest manifestation of its puissance. In knowing immaterial things and essences, entities indigenous to the spiritual world, the mind can proceed upon its own initiative, for its intrinsic and defining power is thinking, and the essences are congeners of thinking as a spiritual energy and enterprise.<sup>7</sup>

The dualistic setting, therefore, does not radically transform the nature and conditions of knowledge of this higher type; or at least it does not accomplish it until a much later stage. Such knowledge had long been aloof from the tissue of material events, and the dualism of substances perpetuates the tradition. But the case with knowledge through sense and imagination was different. We have seen this manifested in the common position that qualities were only signs of differences in things, while those differences were matters susceptible of mathematical and geometrical determination. The status of sense and imagination had to change, because, in the first place, the aspect of immateriality possessed by natural objects in virtue of their form had vanished; the progressive liberation of the form from its individualizing matter as the form, so to speak, ascended through sense to intellect, was abolished. Secondly, on the dualistic basis, all cognition had to take place in the one spiritual

<sup>6</sup> *Ibid.*

<sup>7</sup> Descartes's *Rules for the Direction of the Mind* affords abundant illustrations of this position, as the writer hopes to show in a later paper.

substance, while the object of the cognition was by definition a phenomenon in a wholly different substance. Now the essence of material things, their universal traits, might be known by the direct intuition of thought, the unmediated grasp of the immaterial entity; in this way might the concept of extended substance, the concept of the circle, and the like, be secured. But all further knowledge must depend on the acquisition of some acquaintance with the particular extended object. Such acquisition involved contact, and this contact was furnished by sense and imagination.

In the noonday of scholastic thought, the hierarchial arrangement of substances satisfied manifold needs. It was an elaborate metaphysics, but it was also more. The logical concatenation coincided with the ethical and religious ordering of values and worths. The implicit ideal of metaphysics was a logical deductive arrangement of essences which should fulfil the demands of religious beliefs and ethical conceptions and furnish a world-construction that would cohere with a theological and teleological plan of the universe, of life and history. Now the rational soul could comprehend the essences in their logical ordering. The source of this power of the intellect was its own nature; the rational soul is ideal in nature, akin to the essence, itself an essence in the series. Its power of directly apprehending the essence was conditioned by the limitations of human nature, its frailty, impurity, and the circumstances of bodily life. Conceding the handicap of these limitations, nevertheless, the rational soul was endued with this native underived ability to grasp immaterial entities. Since this capacity pertains to the rational soul as of its inmost nature, no further explanation of this capacity is desirable. To be a rational soul is to possess this power. Further explanation could only be theological allegory.

But knowledge of transient particular things depended on conditions of space and time and the operation of bodily organs. Sense and imagination were instruments of the rational soul, in one sense indispensable for such knowledge. The manner in which the rational soul through such help attained the universal essence could hardly be regarded as satisfactorily explained. For, after all, the rational soul could have profited little by its instruments were it not for the powers germane to the intellect itself. That is, sense and imagination were primarily occasions for the exercise of this essential capacity; the capacity itself was the real reason why the intellectual species could be represented as in some way generated from the sensible species. Indeed, the intellect was given its instruments because its temporary conjunction with the body brought it under the sway of material conditions; after its separation from body, ac-

cordingly, it could dispense with sense and imagination as means of knowing.

The thoughts of the rational soul's native capacity for apprehending immediately the essences, and of its dependence on sense and imagination for knowledge of particular existents, persevere in various guises in later thought. Along with them persists the related distinction between truths of reason and knowledge of fact. Thus in Descartes and other writers phrases like the "light of nature" and the "inner light" express this fundamental endowment of the soul; the meaning of innate ideas should be sought in this connection. Hobbes's contrast of truly scientific knowledge as knowledge from cause to effect with knowledge of opinion as knowledge from effect to cause is rooted in a scholastic view of deduction. His failure to explain how the understanding came into possession of the entities from which it started its deductive process is an omission of the same nature as the scholastic inability to account cogently for the intellect's acquisition of the essence. Throughout modern times a certain degree of mystery has shrouded the mind's ability to possess general ideas and universals, *a priori* truths and axioms. Is not this, with the distinction between truths of reason and empirical generalizations, rooted in the common medieval system?

Now with a dualistic fashion of envisaging the knowledge problem superseding that founded on the old hierarchical system, the efficacy of sense and imagination as instruments becomes still more unsettled. The native power of the mind, as spiritual substance, to apprehend the essences needs explanation just as little and just as much as it did in the earlier system. The soul is a congener of the essence and for this reason no mediating agency between it and the essences is requisite. Much preliminary work in the shape of ridding the mind of prejudices, illusions, and errors that becloud the inner light might be necessary, but in so far as this inner light shines the essences could be grasped without the intervention of another agency. The theological motives are absent and purposes are changed, but the conviction that the soul possesses an inner power equal to the task is the same. In the end the appeal is to the nature of the rational soul itself.

On the dualistic basis knowledge of mutable things, as before, depends on some form of contact. The proof of the serviceableness of sense and imagination is, however, baffling. Then too, the applicability of the essences to things in nature is problematic. The difficulties that had been smoothed over by the snug gradations of the matter-form scheme are now blatant. For knowledge of the world of spirit and the realm of general notions and essences the underived intuitive power of the soul is ample. The enlightened

mind perceives the truth and knows that it knows. But what is to be said concerning knowledge of the world of matter?

Through sense and imagination the two worlds are to be connected. But are they equal to the task? Sense and imagination, in so far as they are cognitive, should be spiritual powers, resident in the soul; in so far, however, as they are concerned with material things, and are, or involve, physiological operations and possess bodily "seats," they must be corporeal. The situation makes for ambiguity, and a certain ambiguity in the treatment of phenomena of sense and imagination is widely characteristic of the early stages of modern epistemology, if not indeed of all stages.

Two qualifications we find introduced here and there to save the situation, in appearance at least: first, the assumption of an interaction of the two substances on the occasion of knowing; secondly, the limiting of cognitive power to understanding alone, leaving sense and imagination as instruments and means in dealing with material things, but possessing in themselves no cognitive power. This latter point is of course simply the continuation of the scholastic tradition; but it can not long be maintained as the consequences of the dualism of substances are recognized. With these qualifications the mind may be said to know spiritual things because, when things affect the senses, an image is produced in the soul, or an act of immediate apprehension of the image is occasioned. This is, to be sure, hardly more than disguising the problem. Just how the spiritual principle apprehends a corporeal image is still a mystery. There is little difference, seemingly, between the soul's directly apprehending an extra-organic object and its apprehending an intra-organic image, phantasm, or excitation of animal spirits. Or if the operation of the object upon the senses occasions the appearance of an image in the soul, the image, it would appear, must be either a spiritual phenomenon and accordingly completely removed from the corporeal, or else it must be material and physiological, and its presence in the spiritual substance a paradox.

The real root of the anomalous situation is that the copy-character of the sense-phenomenon (such as was possessed by the sensible species) no longer exists, while knowledge is still examined as if it still rested, and could rest, upon the principle of correspondence which has been validated by the assumption of that copy-character. When potentiality and realization were the ruling conceptions (secondary and tertiary) qualities were assumed to be properties of the extra-organic object and the species of sense replicas thereof. But with the transference of qualities to the soul, or even to the organism, whatever other implications the transfer might, or might not,

have had for knowledge, the sense-phenomenon was certainly no longer a copy, or replica or reproduction of properties of the object. The demand for correspondence persisting, despite the change, sense and imagination must vibrate between two substances in order that theory might be accommodated both to the new notion of qualities and the old notion of the criterion for determining the veracity of cognition. One may perhaps be permitted to formulate the trouble dilemmatically: if that which occurs in sense-experience is a copy of the material extra-organic object, it is material, and there is no way of explaining how a spiritual cognitive principle can even use it as a means; or, if that which occurs in sense-experience is a spiritual event, the principle that like is known by like, is inapplicable and the veracity of alleged cognition can not be guaranteed by the test of correspondence.

Within the limits of this paper we can not illustrate these contentions by showing their appearance in the works of individuals, nor expound the various ways and degrees in which they were severally affected by the movements that have been described. The purpose of the foregoing fragmentary sketch is not to explain exhaustively the history of all tendencies of thought which defined the environs of modern philosophy at its inception, but to portray the growth of the set of ideas that in particular exercised authority over psychology and the epistemology built thereon. In the work of men so divergently minded as Descartes, Hobbes, and Locke are distinguishable traces of ideas, not generated by the subject-matter, but rather guides in the surveying of the subject-matter. These men and others were breaking with the past; but the break was never so uncompromising as the histories of philosophy often lead the reader to believe. Descartes may have cast aside the scholastic comfortable assurance of the certainty of knowledge; but his dualism was hardly an advance beyond medievalism. Hobbes, for all his discarding of spiritual soul, comparative neglect of the notion of substance and advocacy of the new natural sciences and mathematics, retains a view of the place of deduction that is essentially scholastic. Locke is willing to consider the possibility of a materialistic basis for the soul, but if there is a spiritual substance, has no doubt of interaction, and becomes rationalistic when a counterpoise to the inadequacy of correspondence is needed. In many ways early modern philosophies point back to the course of development that has been sketched, while pointing forward to a new psychology and a psychological epistemology.

A series of transmutations lie ahead. The attacks of Berkeley and Hume upon the notion of substance follow on Hobbes's repudi-

ation of spiritual substance and his practical unconcern with substances of any sort. The empirical tradition made short shrift of the concept of substance, but the victory was never complete. Eradicating the notion of substance may have made a psychology without a soul or a soul-substance possible; but the dissimilarity between thought and things, and body and soul, fostered by the dualism, is at bottom conserved when the soul-substance has been pulverized into mind-dust. Existence retained its irreducible duplicity. The theory of two substances yields to that of two series of states, mental phenomena and physical phenomena. The common expressions, *series of states of consciousness*, *stream of mental events*, *mental states*, or the Lockian *way of ideas*, represent in appearance only freedom from metaphysical bondage. In effect, the psychology of states of mind, with or without a soul, customarily opposes mental state to extra- or intra-organic stimulus, psychosis to neurosis, as effectively as a Descartes ever opposed soul and body. It is supposed that the investigation of the structure and functions of the nervous system will vastly advance psychology. It may be asserted that it has done so; but to that one might retort that it has been in spite of, and not on account of, the discontinuity between the subject-matters of the two sciences. It is hardly unfair to say that common practise in effect simply neglects the discontinuity whenever the discovery is made that a problem can be sufficiently disposed of through physiology. Reducing parallelism or interaction to the level of mere working hypotheses and the adoption of double aspect theories and the like do not seem to eliminate the distinction between the physical and the psychical for the epistemologist nor appreciably mitigate its divorce of thought from things, however much they may facilitate the work of the psychologist. The opposition of the two series operates as an assumption which defines the province and methods of psychology and posits problems for the epistemologist. As has been pointed out, the doctrine of the cognitive correspondence of idea and thing is represented by the correlation of the psychical state with a physical event outside the organism, the psychical states being treated as existences on their own account as much as the physical phenomenon external to the body. The psychical state is also correlated with the intra-organic neurological process; this is the sequel to the older theory of objects causally impressing the soul by means of the excitation of the nerves and animal spirits. The physiological theory, however, has been adapted to the dualistic basis, for to most investigators the possibility of a causal impression on the soul does not obtain, and the physiological process runs its course paralleled by, but not affecting, the mental state. The inter-

actionists, of course, may be regarded as the continuators of the theory that the soul is causally impressed by the agitation of the animal spirits.

This correlation, however, can not be taken to mean a correspondence based on similarity or reproduction by copying; for a mental state is what goes on in one world when something else goes on in a wholly different world. This must be true, at least, of the "appearances," however identical the mental process and the extra-organic or intra-organic process may be at bottom. The metaphysical theory that the physical and the psychical are aspects of one and the same process does not join together the physical and psychical states in a way that is helpful to the epistemologist who starts with these diverse and divorced appearances. If my percept of the typewriter is in consciousness and is mental and psychical, while the extra-organic source of sense-excitation (and the aroused brain-process) are "in appearance" the antithesis of the percept, the assurance that the two are at bottom identical, or aspects of one underlying process, or that one is merely an appearance of that basic reality of which the other is genuinely and organically a part—these assurances do not seem to ameliorate the awkwardness of the situation for the epistemologist. One might flippantly say that it puts him in the position of having to write a metaphysics in order to get a purchase for his epistemology because somebody else's metaphysics has injected into his world of discourse a duality that only another metaphysics can overcome.

The double-edged implication of terms illustrates the difficulties to be surmounted. Sensation, perception, and the image (especially the image) have a physiological meaning and a psychical meaning. They may refer to matters wholly unlike. This is the result of a science having a realm of data peculiarly its own, psychical existence as such, but apparently incapable of abiding in it.

Even in the rationalistic tradition, where the notion of substance continues to have more or less good standing, the objectionableness of a dualism of substances may lead to its repudiation without eliminating, for psychological purposes, and consequently for epistemological investigation, the world division. Whether the psychical and physical series be parallel without reciprocal influence; whether interaction takes place; whether the two series are aspects of a pristine one which is neither of the two series; whether one series is but the externalization of the other, or is related to it as an epiphenomenon; in any case, psychology as psychology does not seem to be helped very much; and the epistemologist's knowing subject and world known remain asunder. A *tief-eingehend* meta-

physics may attain such a resolution of the discord, but a mundane psychology must busy itself with the double series and remain, so far as one can observe, unconsoled by the assurance of the ultimate unity of its apparently dual subject-matter. Of course, such metaphysical quests may reintroduce the notion of the unitary substantial soul, but again this is of no concern to the psychologist, save, perhaps, as a relief when about to relinquish a problem as insoluble in terms of the two series.

The writer, it may be added, disclaims any intention of being impertinent to the psychologist. The only justification for this paper is that it may contribute somewhat to a clarification of the difficulties in which psychology and epistemology now seem to be involved, in the hope that whatever artificial and spurious elements the problems comprise may be discovered and weeded out. Psychology will doubtless be that which those who cultivate it decide that it should and must be. But the fate of epistemology appears to be intimately bound up with that of psychology. And if we validate the assumptions and point of view that historically has generally been characteristic of the psychological tradition, we are validating in some sense and degree a dualism of substances, or dual view of existence, and in its mildest form we leave a breach between mind and the natural world that is a persistent impediment to the epistemologist. That is, we are accepting a type of metaphysics in a subtly pervading form, very much as the scholastic looked out upon nature through metaphysical spectacles inherited from long-deceased ancestors. Taking courage, one might formulate the state of affairs as involving three alternatives: first, we may accept the olden dualistic type of psychology, and expect the perpetuation of all the epistemological tangles resting thereon; or a new kind of psychology may be given us, with the possibility of a reformulation of epistemological problems that will promise a measurable advance toward agreement and solution; or finally, as some hardy spirits do, we may declare that psychology and epistemology have nothing to do with one another, and be as serenely indifferent to the ways of the psychologist as the scientist is to the ways of the epistemologist.

For epistemological inquiry, the establishment of a dualism of substances or some view of existence as twofold as the foundation of psychology and thereby directly and indirectly of epistemology, has its immitigable effects. What, let us ask, has become of Aquinas's notion of the sensible and intellectual species as the means, not the object, of knowledge? Or Descartes's view of sense and imagination as instruments without cognitive value in themselves? Or of any view that assumes that we know things by way of ideas through the correspondence of the ideas with things?

Briefly, the answer must depend on the fact that these instruments and means, when existence is split into halves, are either like the object of knowledge, and are therefore no longer functions of mind, but functions of the physical world, and as resident in that world, are part and parcel of the object of knowledge; or they are processes in the mind, and in no continuity with the object of knowledge. In neither case can their instrumental functions be retained unimpaired. If physical, they are not mental at all, and can play no part in knowing. If psychical and mental, they are, presumably, no more like the object than anything else mental, and their mediating power has departed. If sensations, percepts, and images are in and of the physical world, as wholly physiological processes, they are out of mind, and how they can be instruments of knowing is explicable only on the basis of gratuitous assumptions. If these terms have a double meaning, referring both to a psychical and a physiological process, the one is in mind, the other out of it, just as much as ever. But if the terms indicate a double process, can we maintain that they are still the means of knowing? Just how it can be done is not easy to see. Sense and imagination as physiological, if knowing is an antithetical psychical event, are simply in another world, as far removed from the genuine knowing process as any other events in the world of nature. But how about the psychical correlations? They have no likeness to things. If sensations, percepts, and images are psychical, and if knowledge depends on the correspondence of similars, no knowing of things is possible, for these psychical facts are like nothing else on earth but themselves. Furthermore, even assuming that every psychical event has its physiological (and physical) correlate in no wise helps, for this very assumed correlation shuts the subject up within the world of the psychical and the psychical correlates. Knowing must be confined to the psychical, all that can be known are the psychical representatives; the means and instruments, therefore, become the objects of knowledge. The representatives have no credentials. Or, if it be thought that they possess them, there is no way of verifying them, for the verifying mind can not step outside the psychical in order to assure itself that there was something at all to be represented, much less what is represented and how correct and constant the representation is. The assumption of a correlation must remain an assumption, though how we happen to make it is a mystery.

In short, sensations, percepts, and images, losing all likeness to, and continuity with, the physical events in whose existence we are constrained to believe, may be assumed to have a sign character, but

neither this nor the constancy and the unequivocalness of this character can be established by the test of correspondence without begging the question. The beginning and end of knowing is in the psychical, so long as the two-world view is consistently upheld, and a test for knowledge must be devised which involves no spanning of the gap between the two worlds. Properly speaking any test or criterion at all that relates knowledge to the extra-psychical will involve an assumption which can not be demonstrated. The dictum of Aquinas's must be changed: that which we know first, last, and all the time is our own psychical state. The sensible and intelligible species are all psychical, ideas in the mind, and knowing has to do with ideas.

The question to be put is this: If the historical development has been correctly outlined, and if psychology conserves the assumption or doctrine of two irreducible, unconnected worlds of existence, must not epistemology, when it utilizes that psychology, commit itself to just these difficulties? It may be asserted that history has proved that there are ways out; or at least that they have been suggested. But it is logically impossible to connect two things that by definition can not be connected. Is it not true that attempts to overcome these dualistic difficulties have either been evasions, appeals to metaphysics, inconsistencies, or finally the evoking of a different psychology? The occasionalist may refer to the activity of the deity for the solution of the problem, but this is hardly an epistemological answer to an epistemological problem. Indeed, many of the suggested ways out are metaphysical short-cuts. Thus a spiritualistic metaphysics by the affirmation of an essential identity of matter and mind; but so long as in the world of appearance the two spheres are diametrically opposed, it is doubtful if epistemology has profited. The distinction between primary and secondary qualities has been a suggested solution, but this in the end must signify either an outright inconsistency or a rejection of the dual view. The assumption of a Kantian unknown *X*, a necessary I-know-not-what, is a confession of failure, not a solution. Certainly, even the modern realist asserting that relativity to the organism does not involve relativity to consciousness, is breaking with the traditional psychology. The vexatious thing is that one can not eat one's cake and have it too—one can not break with the older psychology and continue to use it. And so impregnated have become language and common sense with the dualistic view that one finds oneself involved in it just when one is confident he has expelled it. Furthermore, the endeavor to reestablish the criterion of correspondence never quits the field, and the attempt is always prejudiced by a psychology that has no room for correspondence. Interaction between the

physical and the psychical does not seem to help matters in a sophisticated day as the interaction of body and mind on the occasion of knowing comforted Descartes. When sense-data, and all psychological processes, are regarded as completely mental, and added to this is the equivalence of the mental, the psychic, and the conscious; when knowing, start and terminus, is in this psychical world, and by common assumption whatever else there is (if there be anything else) is wholly alien to thought; then, surely, the choice is between subjectivism and despair. When we feel compelled to prove the existence of an external world, while the scientist and the man on the street alike assume its existence and take for granted some acquaintance with and knowledge of it, one can not resist the conclusion that there is something artificial and spurious in the problems generated by the dual view of existence.

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### ESTIMATION OF CENTIDIURNAL PERIODS OF TIME: AN EXPERIMENTAL INVESTIGATION OF THE TIME SENSE

*Problem and Conditions of the Experiment.*—The aim of this investigation was to determine the accuracy and steadiness of judgment in estimating small portions of a day. The experiment was performed at Pittsburgh, December 27 to 29, 1917. Thirty-three subjects took part, all well trained in psychological observation; all but five were members of the American Psychological Association, through whose courtesy the names of the subjects with standard time assigned to each were printed and distributed before the experiment started. In addition to the subjects themselves about 75 persons assisted the experimenter in absorbing the sound waves.<sup>1</sup>

The conditions of the experiment were as follows: The subject was directed to stand up and talk without intermission during a stated interval of time. The choice of topic was left entirely to the option of the subject, and he was free to speak with or without notes, to read aloud, to illustrate by charts, chalk, *etc.* The period of time assigned was 15 minutes in case of 25 subjects, 10 minutes for 5 subjects, 5 minutes for 1 subject, while 2 were left free to choose their own period. It will be observed that the 15-minute

<sup>1</sup> The writer wishes cordially to thank his subjects, some of whom came from a considerable distance at great personal inconvenience to participate in the experiment; he wishes also to express special gratitude to his assistants for their faithful cooperation, without which the auditory shock might at times have disrupted the atmosphere and demobilized the investigation.